PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-219834
(43)Date of publication of application : 14.08.2001

(51)Int.Cl. B60T 8/26
B60T 8/28
B60T 8/58

(21)Application number : 2000-035157
(22)Date of filing : 14.02.2000

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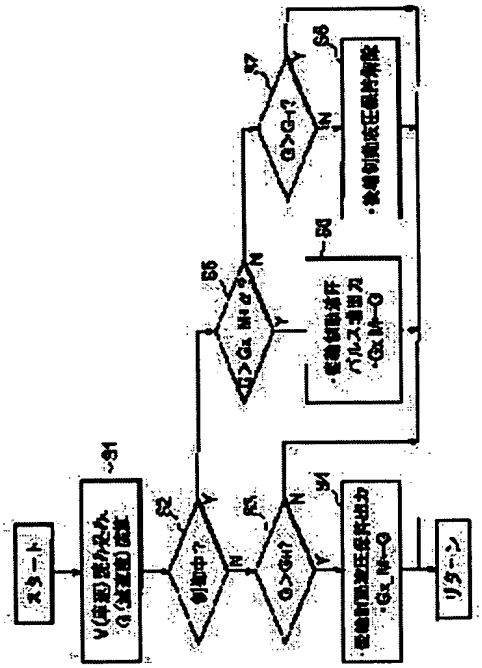
(54) BRAKING CONTROL DEVICE FOR VEHICLE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a braking control device allowing a driver to feels no sense of incompatibility in the braking operation while maintaining the brake performance and the stability of the vehicle.
SOLUTION: The braking force applied to rear wheels of the vehicle when the vehicle is in a predetermined operational made is limited compared with other cases (Step S4), and when the driver judges that the braking quantity is increased during the control of the braking force (transfer from Step S5 to Step S6), the braking force applied to the rear wheels is increased (Step S6).



LEGAL STATUS

[Date of request for examination] 19.05.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or

application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1] It is a braking control unit for cars equipped with the braking control section which performs damping force limit control which restricts the damping force given to the rear wheel of a car when a car is predetermined operational status as compared with the case of being other. It has further an amount judging means of brakes operation to judge the amount of brakes operation by the operator. Said braking control section The braking control unit for cars which performs control which makes the damping force given to a rear wheel increase when it judges with the amount of brakes operation increasing with said amount judging means of brakes operation during said damping force limit control.
[Claim 2] Said braking control section is a braking control unit for cars according to claim 1 which judges with it being said predetermined operational status when the deceleration of a car is beyond a predetermined value, and performs said damping force limit control.
[Claim 3] Said amount judging means of brakes operation is a braking control unit for cars given in either of claims 1 or 2 which judge increase of the amount of brakes operation by the operator by judging the increment in the deceleration of said car.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to the equipment which performs control which restricts the damping force given to the rear wheel of an automobile compared with a front wheel about the braking control unit for cars.
[0002]
[Description of the Prior Art] In order to prevent the lock of the rear wheel at the time of high-speed braking, the braking control unit which performs control which restricts the damping force distributed to a rear wheel is known. The technique currently indicated by JP,5-213169,A holds the fluid pressure which transmits damping force to a rear wheel by the fluid pressure at the time, when deceleration reaches beyond a predetermined value at the time of braking. It is indicated that it prevents that a rear wheel locks ahead of a front wheel by this, and a sideslip of the car at the time of braking can be prevented effectively.
[0003]
[Problem(s) to be Solved by the Invention] However, with the above-mentioned technique, since the damping force of a rear wheel will be restricted if predetermined deceleration is reached, although an operator breaks in the method of being higher, and a brake pedal for damping force, damping force does not increase, but an operator feels sense of incongruity.
[0004] This invention makes it a technical problem to offer the braking control unit for cars for which an operator is not made to sense the sense of incongruity of brakes operation, maintaining braking nature and the stability of a car in view of the above-mentioned trouble.
[0005]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the braking control unit for cars concerning this invention It is a braking control unit for cars equipped with the braking control section which performs damping force limit control which restricts the damping force given to the rear wheel of a car when a car is predetermined operational status as compared with the case of being other. It has further an amount judging means of brakes operation to judge the amount of brakes operation by the operator. This braking control section When judged with the amount of brakes operation increasing with the amount judging means of brakes operation during damping force limit control, it is characterized by performing control which makes the damping force given to a rear wheel increase.
[0006] According to this invention, when the amount of brakes operation increases, the moderation force of a car is made to increase by making not only a front wheel but the damping force given to a rear wheel increase, and car behavior suitable for an operator's actuation feeling is realized.
[0007] Here, when the deceleration of a car is beyond a predetermined value, as for a braking control section, it is desirable to judge with it being this predetermined operational status, and to perform damping force limit control. Since damping force limit control is not performed in the small decelerating condition while preventing the lock of a car certainly and stabilizing the behavior of a car with

restricting the damping force given to a rear wheel based on deceleration, braking nature is also secured.

[0008] The amount judging means of brakes operation may judge increase of the amount of brakes operation by the operator by judging the increment in the deceleration of a car. Since the damping force given to a front wheel is not restricted when an operator breaks in a brake pedal further during damping force limit control, the damping force given to a front wheel according to pedal actuation increases, consequently the deceleration of a car increases. Therefore, it is possible to judge increase of the amount of brakes operation also from increase of the deceleration of a car.
[0009]
[Embodiment of the Invention] Hereafter, the suitable operation gestalt of this invention is explained to a detail with reference to an accompanying drawing. Drawing 1 is drawing showing the configuration of the braking control unit for cars concerning this invention, and drawing 2 is drawing showing the configuration of the braking system of a car which carried this control unit.
[0010] First, with reference to drawing 2 , it explains from the configuration of the braking system of a car. The foil cylinders 25-28 for wheel braking are formed in each of front wheels FR and floor line and rear wheels RR and RL, and this car has the composition that this brakes a car.
[0011] And the brake pedal 10 for operating this braking system is connected to the piston shaft of a master cylinder 11. The brake switch 40 which detects the actuation condition of a brake pedal is connected to the brake pedal 10.
[0012] From this master cylinder 11, two working-fluids Rhine of the forward right ring FR, the object for the left rear rings RL, and the for the forward left ring floor line and for the right rear rings RR extends, and each working-fluid Rhine is connected to the foil cylinders 25-28 of each wheel through the brake actuator 50. Each working-fluid Rhine branches within the brake actuator 50, the maintenance solenoid valves 15-18 and the reduced pressure solenoid valves 35-38 are arranged corresponding to each foil cylinders 25-28, and the pump 12 (13) and the reservoir 22 (23) are arranged between each reduced pressure solenoid valves 35 and 38 (36 37) and a tee.
[0013] The output signal of the wheel speed sensors 41-44 which detect each wheel speed of the brake switch 40, and front wheels FR and floor line and rear wheels RR and RL is supplied to the braking control unit 100 which serves both as the braking control section of the braking control device for cars and the amount judging means of brakes operation concerning this invention. Furthermore, the braking control unit 100 controls each solenoid valves 15-18 of the brake actuator 50, and 35-38, respectively.
[0014] Next, the damping force proportioning control of a ring before and after being the description of braking control of the car braking control unit concerning this invention is explained. Drawing 3 is a flow chart which shows this proportioning control, and drawing 4 is a graph which shows the relation of the decelerating threshold and the vehicle speed which perform a proportioning control.
[0015] First, if it gets into a brake pedal 10, the piston shaft of a master cylinder 11 will be pushed and the fluid pressure (master **) according to a control input will occur. The maintenance solenoid valves 15-18 of each wheel are in an open condition, and, on the other hand, the reduced pressure solenoid valves 35-38 are in a cut off state at the beginning of braking initiation. Consequently, master ** is led to the foil cylinders 25-28 of each wheel, a brake is operated, and damping force is given to each wheel.
[0016] In step S1, the damping force proportioning control concerning this invention is calculating Deceleration G from the variation of the vehicle speed V while the braking control unit 100 supervises the vehicle speed V based on the output signal of each wheel speed sensors 41-44. And at step S2, it judges whether the limit control of fluid pressure Pr mentioned later is [current] under activation.
[0017] In not being under activation now, it shifts to step S3, and it judges whether it is over the decelerating threshold GH set up according to the vehicle speed V as the present deceleration G is shown in drawing 4 . When Deceleration G is below the decelerating threshold GH, limit control is not performed but control processing is ended. It is holding the fluid pressure Pr which shifts to step S4 on the other hand when Deceleration's G is over the decelerating threshold GH, intercepts the maintenance solenoid valves 17 and 18 connected to the foil cylinders 27 and 28 of rear wheels RR and RL, respectively, and is supplied to each foil cylinder 27 and 28 to the fluid pressure in the time, and

subsequent fluid pressure Pr rises are restricted. Consequently, the damping force given to a rear wheel is restricted, the unnecessary lock of a rear wheel is controlled, and the behavior of a car is stabilized.
[0018] As shown in drawing 4 , while preventing wandering of the car by the rear wheel lock which is easy to take place especially at the time of a high speed by setting up so small that the vehicle speed V becoming large the threshold GH of the deceleration which performs this braking limit control, the braking engine performance in a low-speed area is securable. Although the decelerating threshold GH is suitably set up by the classification of a car etc., it may change and use two or more functions according to a shift condition etc. Moreover, it may set up as a function of the vehicle speed V, or you may include in the memory in the braking control unit 100 as a table to the vehicle speed V.
[0019] In step S4, the value of the deceleration when starting this braking limit control is further stored in variable Gx#M, and it holds in the memory in the braking control unit 100.
[0020] When this braking limit control has already been performed, it shifts to step S5 from step S2. At step S5, it judges whether the current deceleration G has exceeded by the predetermined value alpha from the value stored in variable Gx#M. When having exceeded, it shifts to step S6, and the fluid pressure Pr supplied to each foil cylinder 27 and 28 is made to boost a little in pulse by opening temporarily the maintenance solenoid valves 15 and 18 connected to the foil cylinders 27 and 28 of rear wheels RR and RL, respectively.
[0021] In this control, since the fluid pressure Pf supplied to the foil cylinders 25 and 26 of each of front wheels FR and floor line has not received limit control, when it gets into a brake pedal 10, fluid pressure Pf increases according to it, the damping force given to front wheels FR and floor line increases, and deceleration becomes large. By this invention, by increasing the damping force of a rear wheel a little, when deceleration increases during activation of braking control of a rear wheel beyond the predetermined value alpha, when an operator breaks in a brake pedal 10 during braking control, according to this, the damping force by the side of a rear wheel can also be increased, and an operator does not sense sense of incongruity for brakes operation. Moreover, the stability of the car behavior especially at the time of braking at a high speed is maintained at the time of braking by setting up suitably the amount of damping force increases of a rear wheel, and the deceleration which performs damping force increase.
[0022] At step S6, the value further stored in variable Gx#M with the value of the deceleration when changing this rear wheel damping force is replaced, and it holds in the memory in the braking control unit 100.
[0023] When the current deceleration G is below the value plus predetermined value alpha stored in variable Gx#M, it shifts to step S7 and judges whether the current deceleration G is over the decelerating threshold GH. When having exceeded, in order to continue braking limit control, it ends without processing others. When the current deceleration G is below the decelerating threshold GH, by opening discharge 17 and 18, i.e., maintenance solenoid valves, for braking limit control, fluid pressure Pr is henceforth set up like fluid pressure Pf, and it sets it up similarly to the damping force to which the damping force given to a rear wheel is given by the front wheel.
[0024] Then, concrete control is explained with reference to drawing 5 . Drawing 5 is a graph showing time amount change of the deceleration at the time of the braking control by the car braking control device concerning this invention, and brake oil pressure.
[0025] An operator breaks in a brake pedal 10 at the time of the time of day 0 shown in drawing 5 , and suppose that moderation actuation was started. It increases, as the fluid pressure Pf supplied to the foil cylinders 25 and 26 of each of front wheels FR and floor line and the fluid pressure Pr supplied to a rear wheel RR and the foil cylinders 27 and 28 of each RL are shown in drawing 5 according to treading in of a brake pedal 10, respectively. Thereby, Deceleration G increases and moderation of a car is performed.
[0026] Since a decelerating threshold is set as comparatively big GHa as shown in drawing 4 when it is Va with the comparatively slow vehicle speed, that limit control of the damping force which fluid pressure Pr is held and is given to rear wheels RR and RL as shown in drawing 5 is performed consists of braking initiation at the time of the late time of day t2.

[0027] Since a decelerating threshold is set as comparatively small GHb as shown in drawing 4 when it is Vb with the comparatively quick vehicle speed, braking control is started at the time of the time of day t0 earlier than time of day t2. And after that, at the time of time of day t1, since deceleration comes to be larger than the deceleration GHb at the time of control initiation by the predetermined value alpha, fluid pressure Pr increases in pulse here. Furthermore, at the time of time of day t3, since deceleration comes to be larger than the deceleration GHb at the time of control initiation by 2alpha, fluid pressure Pr increases in pulse again.

[0028] Here, although it explained that time amount change of the fluid pressure Pr given to a rear wheel side was carried out pulse-wise, i.e., stair-like, for explanation, fluid pressure Pr may be smoothly changed with the braking control unit 100 so that crew may not memorize sense of incongruity.

[0029] Moreover, in the above explanation, although an operator's amount of brakes operation was judged based on decelerating change, increase of the amount of brakes operation may be judged by detecting a brake stroke and increase of master **. Moreover, braking control of a rear wheel is good also as a configuration which detects the amount increase of slips of a rear wheel based on the output value of each wheel speed sensor, and controls braking.

[0030]

[Effect of the Invention] An operator does not feel sense of incongruity about brakes operation, stabilizing the behavior of a car by lowering the braking force distribution to the rear wheel at the time of a high speed, since the damping force given to a rear wheel is made to increase when performing control which restricts the damping force given to a rear wheel in predetermined operational status according to this invention, as explained above when an operator increases the amount of brakes operation during activation of this limit control.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing the configuration of the braking control unit for cars concerning this invention.
[Drawing 2] It is drawing showing the configuration of the braking system of a car which carried the control unit of drawing 1 .
[Drawing 3] It is the flow chart which shows the proportioning control by the equipment of drawing 1 .
[Drawing 4] It is the graph which shows the relation between a decelerating threshold and the vehicle speed.
[Drawing 5] It is a graph showing time amount change of the deceleration at the time of the braking control by the car braking control device concerning this invention, and brake fluid pressure.
[Description of Notations]
10 [-- 22 A maintenance solenoid valve 23 / -- A reservoir, 25-28 / -- A foil cylinder, 35-38 / -- A reduced pressure solenoid valve, 40 / -- A brake switch, 41-44 / -- A wheel speed sensor, 45 / -- A linear G sensor, 50 / -- A brake actuator, 100 / -- A moderation force-control unit, 120 / -- Memory unit.] -- A brake pedal, 11 -- 12 A master cylinder, 13 -- A pump, 15-18

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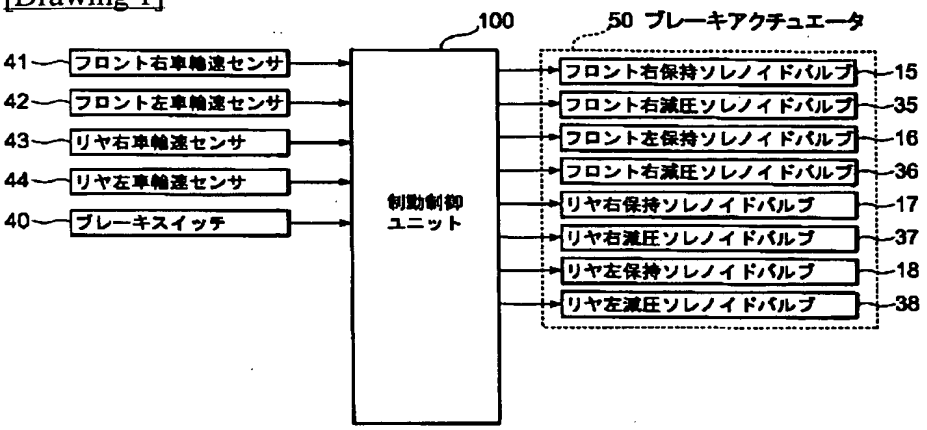
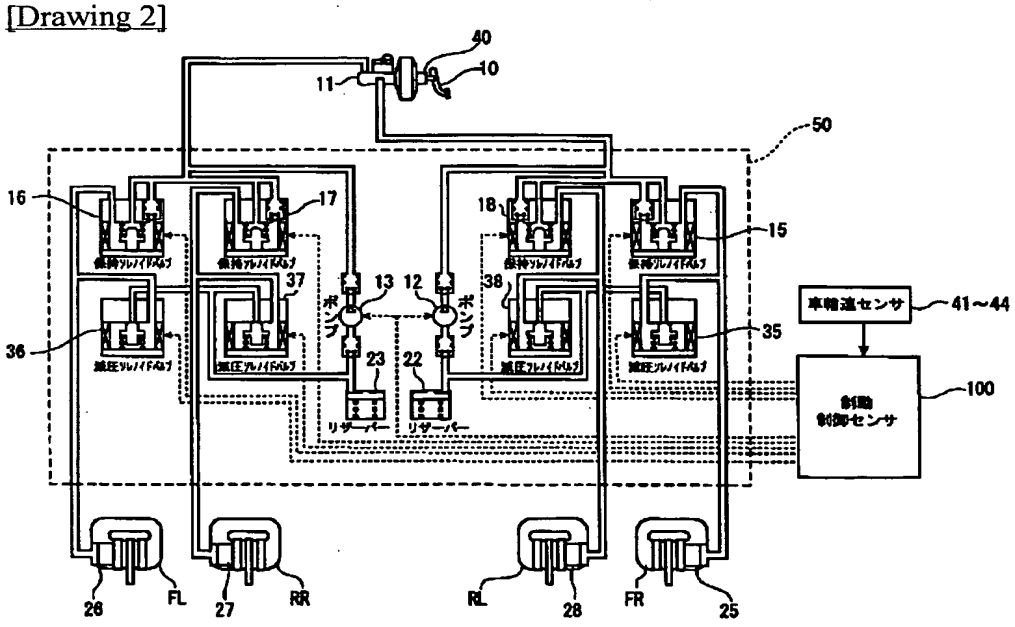
DRAWINGS

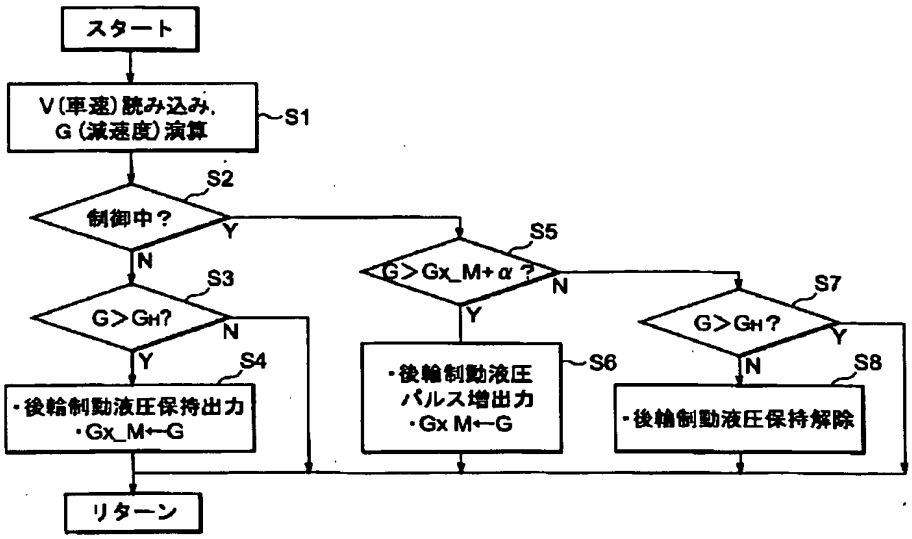
[Drawing 1]



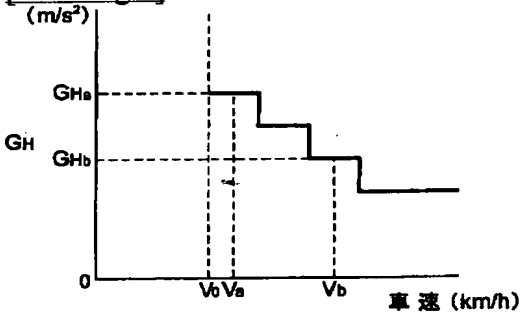
[Drawing 2]



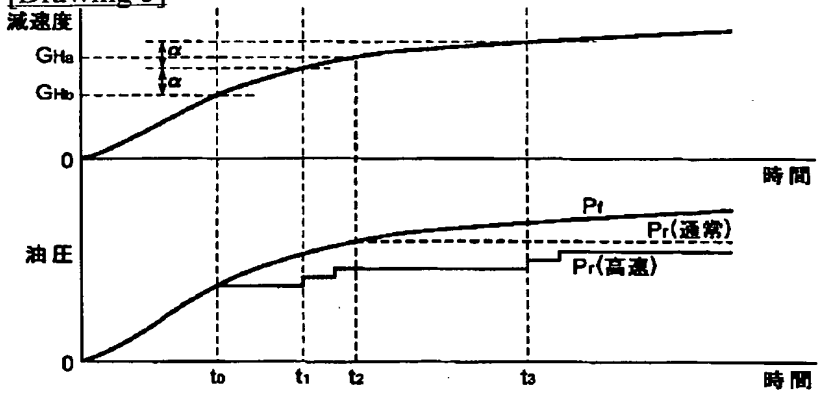
[Drawing 3]



[Drawing 4]



[Drawing 5]



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(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2001－219834
（P2001－219834A）
(43)公開日　平成13年８月14日(2001.8.14)

(51)Int.Cl.'		識別記号	Ｆ Ｉ		テーマコード'(参考)	
Ｂ６０Ｔ	8/26		Ｂ６０Ｔ	8/26	Ｈ	３Ｄ０４５
	8/28			8/28	Ａ	３Ｄ０４６
	8/58			8/58	Ｚ	

審査請求　未請求　請求項の数３　ＯＬ　（全６頁）

(21)出願番号　特願2000－35157(P2000－35157)

(22)出願日　平成12年２月14日(2000.2.14)

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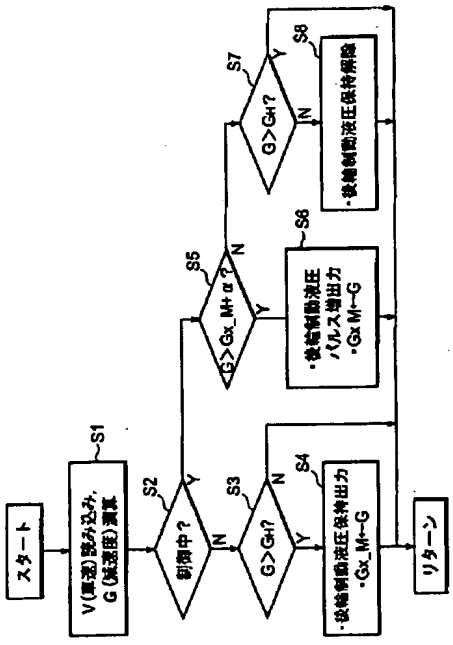
最終頁に続く

(54)【発明の名称】　車両用制動制御装置

(57)【要約】
【課題】　制動性、車両の安定性を維持しつつ、運転者にブレーキ操作の違和感を感じさせない車両用制動制御装置を提供する。
【解決手段】　車両が所定の運転状態である場合に車両の後輪に付与する制動力をそれ以外の場合に比して制限する制動力制限制御を行う（ステップＳ４）ものであり、この制動力制限制御中に運転者によりブレーキ操作量が増大していると判定した場合（ステップＳ５からステップＳ６へ移行）には、後輪に付与される制動力を増大せしめる（ステップＳ６）。



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【特許請求の範囲】

【請求項１】　車両が所定の運転状態である場合に車両の後輪に付与する制動力をそれ以外の場合に比して制限する制動力制限制御を行う制動制御部を備える車両用制動制御装置であって、

運転者によるブレーキ操作量を判定するブレーキ操作量判定手段をさらに備え、前記制動制御部は、前記制動力制限制御中に前記ブレーキ操作量判定手段によりブレーキ操作量が増大していると判定した場合には、後輪に付与される制動力を増大せしめる制御を実行する車両用制動制御装置。

【請求項２】　前記制動制御部は、車両の減速度が所定値以上である場合に前記所定の運転状態であると判定して前記制動力制限制御を行う請求項１記載の車両用制動制御装置。

【請求項３】　前記ブレーキ操作量判定手段は、前記車両の減速度の増加を判定することにより運転者によるブレーキ操作量の増大を判定する請求項１または２のいずれかに記載の車両用制動制御装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、車両用の制動制御装置に関し、特に、自動車の後輪に付与する制動力を前輪に比べて制限する制御を行う装置に関する。

【０００２】

【従来の技術】高速制動時の後輪のロックを防止するため、後輪に分配される制動力を制限する制御を行う制動制御装置が知られている。特開平５－２１３１６９号公報に開示されている技術は、制動時に減速度が所定値以上に達した場合には、後輪に制動力を伝達する液圧をその時点の液圧で保持するものである。これにより後輪が前輪より先にロックするのを防止し、制動時の車両の横滑りを効果的に防止できると記載されている。

【０００３】

【発明が解決しようとする課題】しかしながら、上記技術では、所定の減速度に達すると後輪の制動力が制限されるため、運転者が制動力を高めようとブレーキペダルを踏み込んでも制動力が増加せず、運転者はブレーキ操作に違和感を感ずる。

【０００４】本発明は上記問題点に鑑みて、制動性、車両の安定性を維持しつつ、運転者にブレーキ操作の違和感を感じさせない車両用制動制御装置を提供することを課題とする。

【０００５】

【課題を解決するための手段】上記課題を解決するため、本発明に係る車両用制動制御装置は、車両が所定の運転状態である場合に車両の後輪に付与する制動力をそれ以外の場合に比して制限する制動力制限制御を行う制動制御部を備える車両用制動制御装置であって、運転者によるブレーキ操作量を判定するブレーキ操作量判定手段をさらに備え、この制動制御部は、制動力制限制御中にブレーキ操作量判定手段によりブレーキ操作量が増大していると判定された場合には、後輪に付与される制動力を増大せしめる制御を実行することを特徴とする。

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【０００６】本発明によれば、ブレーキ操作量が増大した場合には、前輪だけでなく後輪に付与される制動力も増大せしめることで車両の減速力を増大せしめ、運転者の操作感覚に合った車両挙動が実現される。

【０００７】ここで、制動制御部は、車両の減速度が所定値以上である場合にこの所定の運転状態であると判定して制動力制限制御を行うことが好ましい。減速度を基にして後輪に付与される制動力を制限することで、車両のロックを確実に防止して車両の挙動を安定させるとともに、減速度の小さい状態では制動力制限制御が行われないので、制動性も確保される。

【０００８】ブレーキ操作量判定手段は、車両の減速度の増加を判定することにより運転者によるブレーキ操作量の増大を判定してもよい。制動力制限制御中に運転者がブレーキペダルをさらに踏み込んだ場合、前輪に付与される制動力は制限されていないため、ペダル操作に応じて前輪に付与される制動力は増大し、この結果、車両の減速度は増大する。したがって、車両の減速度の増大からもブレーキ操作量の増大を判定することが可能である。

【０００９】

【発明の実施の形態】以下、添付図面を参照して本発明の好適な実施形態について詳細に説明する。図１は、本発明に係る車両用制動制御装置の構成を示す図であり、図２は、この制御装置を搭載した車両の制動系の構成を示す図である。

【００１０】まず、図２を参照して車両の制動系の構成から説明する。この車両は、前輪ＦＲおよびＦＬと後輪ＲＲおよびＲＬのそれぞれに車輪制動用のホイルシリンダ２５～２８が設けられており、これによって車両の制動を行う構成となっている。

【００１１】そして、この制動系を操作するためのブレーキペダル１０は、マスタシリンダ１１のピストン軸に接続されている。ブレーキペダル１０には、ブレーキペダルの操作状態を検出するブレーキスイッチ４０が接続されている。

【００１２】このマスタシリンダ１１からは、右前輪ＦＲと左後輪ＲＬ用と左前輪ＦＬと右後輪ＲＲ用の２つの作動液ラインが延び、それぞれの作動液ラインは、ブレーキアクチュエータ５０を介して各車輪のホイルシリンダ２５～２８に接続されている。ブレーキアクチュエータ５０内で各作動液ラインは分岐されて、各ホイルシリンダ２５～２８に対応して保持ソレノイドバルブ１５～１８と減圧ソレノイドバルブ３５～３８が配置されており、各減圧ソレノイドバルブ３５、３８（３６、３７）と分岐部の間にポンプ１２（１３）とリザーバー２２

（２３）が配置されている。

【００１３】本発明に係る車両用制動制御装置の制動制御部とブレーキ操作量判定手段を兼ねる制動制御ユニット１００には、ブレーキスイッチ４０と、前輪ＦＲおよびＦＬと後輪ＲＲおよびＲＬのそれぞれの車輪速を検出する車輪速センサ４１～４４の出力信号が供給される。さらに、制動制御ユニット１００は、ブレーキアクチュエータ５０の各ソレノイドバルブ１５～１８と３５～３８をそれぞれ制御する。

【００１４】次に、本発明に係る車両制動制御装置の制動制御の特徴である前後輪の制動力配分制御について説明する。図3は、この配分制御を示すフローチャートであり、図4は、配分制御を行う減速度閾値と車速の関係を示すグラフである。

【００１５】まず、ブレーキペダル１０が踏み込まれると、マスタシリンダ１１のピストン軸が押されて、操作量に応じた液圧（マスタ圧）が発生する。制動開始当初は、各車輪の保持ソレノイドバルブ１５～１８は開放状態にあり、一方、減圧ソレノイドバルブ３５～３８は遮断状態にある。この結果、マスタ圧は各車輪のホイルシリンダ２５～２８へと導かれ、ブレーキを作動させて各車輪に制動力が付与される。

【００１６】本発明に係る制動力配分制御は、ステップＳ１において、制動制御ユニット１００が、各車輪速センサ４１～４４の出力信号を基に、車速Ｖを監視するとともに、車速Ｖの変化量から減速度Ｇを演算している。そして、ステップＳ２では、後述する液圧Ｐｒの制限制御を現在実行中であるか否かを判定する。

【００１７】現在実行中でない場合にはステップＳ３へと移行し、現在の減速度Ｇが図４に示されるように車速Ｖに応じて設定されている減速度閾値G_Hを越えているか否かを判定する。減速度Ｇが減速度閾値G_H以下である場合には制限制御は行わず制御処理を終了する。一方、減速度Ｇが減速度閾値G_Hを越えている場合はステップＳ４へと移行し、後輪ＲＲ、ＲＬのホイルシリンダ２７、２８にそれぞれ接続されている保持ソレノイドバルブ１７、１８を遮断してそれぞれのホイルシリンダ２７、２８へと供給される液圧Ｐｒをその時点での液圧に保持することで、以降の液圧Ｐｒ上昇を制限する。この結果、後輪に付与される制動力が制限され、後輪の不要なロックを抑制し、車両の挙動を安定させる。

【００１８】図４に示されるように、この制動制限制御を行う減速度の閾値G_Hを車速Ｖが大きくなるほど小さく設定することで、特に高速時に起こりやすい後輪ロックによる車両のふらつきを防止するとともに低速域での制動性能を確保できる。減速度閾値G_Hは、車両の種別等により適宜設定されるものであるが、シフト状態等に応じて複数の関数を切り替えて使用してもよい。また、車速Ｖの関数として設定したり、車速Ｖに対するテーブルとして制動制御ユニット１００内のメモリに組み込んでおいてもよい。

【００１９】ステップＳ４では、さらに、この制動制限制御を開始したときの減速度の値を変数Ｇｘ#Ｍに格納して制動制御ユニット１００内のメモリに保持しておく。

【００２０】既にこの制動制限制御が行われている場合は、ステップＳ２からステップＳ５へと移行する。ステップＳ５では、現在の減速度Ｇが変数Ｇｘ#Ｍに格納されている値より所定値α分越えているか否かを判定する。越えている場合にはステップＳ６へと移行して、後輪ＲＲ、ＲＬのホイルシリンダ２７、２８にそれぞれ接続されている保持ソレノイドバルブ１５、１８を一時的に開放することによりそれぞれのホイルシリンダ２７、２８へと供給する液圧Ｐｒをパルス的に若干増圧させる。

【００２１】本制御においては、前輪ＦＲ、ＦＬそれぞれのホイルシリンダ２５、２６へ供給する液圧Ｐｆは制限制御を受けていないため、ブレーキペダル１０が踏み込まれた場合は、液圧Ｐｆはそれに応じて増大して、前輪ＦＲ、ＦＬに付与される制動力が増大して減速度が大きくなる。本発明では、後輪の制動制御の実行中に所定値α以上に減速度が増大した場合に後輪の制動力を若干増大させることで、運転者が制動制御中にブレーキペダル１０を踏み込んだ場合に、これに応じて後輪側の制動力も増大させることができ、運転者がブレーキ操作に違和感を感じることがない。また、後輪の制動力増大量と制動力増大を行う減速度を適宜設定することにより、制動時、特に高速での制動時における車両挙動の安定性が維持される。

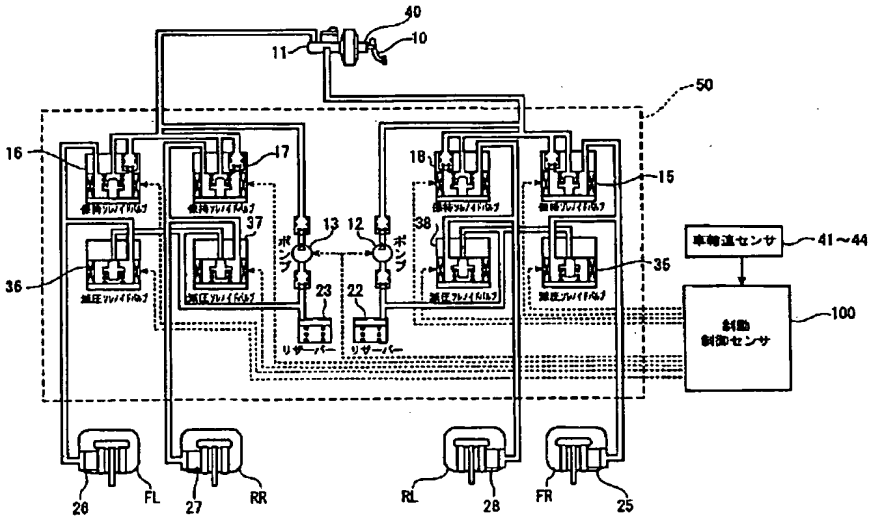
【００２２】ステップＳ６では、さらに、この後輪制動力を変更したときの減速度の値で変数Ｇｘ#Ｍに格納している値を置き換え、制動制御ユニット１００内のメモリに保持しておく。

【００２３】現在の減速度Ｇが変数Ｇｘ#Ｍに格納されている値プラス所定値α以下である場合は、ステップＳ７へと移行し、現在の減速度Ｇが減速度閾値G_Hを越えているか否かを判定する。越えている場合は、制動制限制御を続行するため、その他の処理を行わずに終了する。現在の減速度Ｇが減速度閾値G_H以下であるときには、制動制限制御を解除、つまり、保持ソレノイドバルブ１７、１８を開放することで、以後は液圧Ｐｒを液圧Ｐｆと同様に設定し、後輪へ付与される制動力を前輪に付与される制動力と同じに設定する。

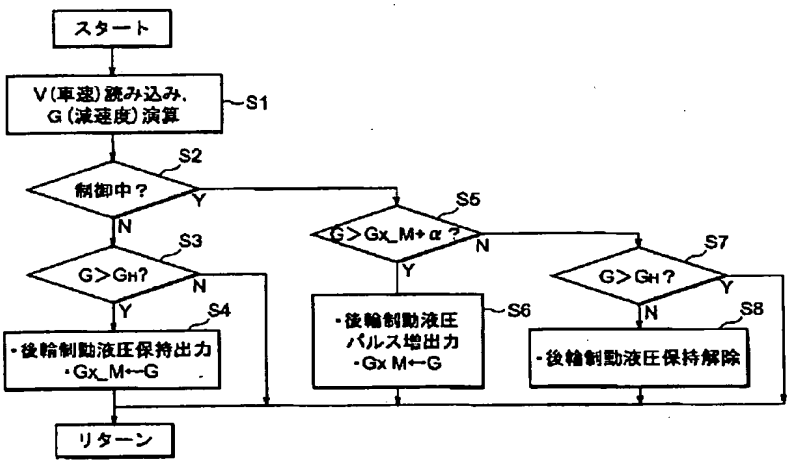
【００２４】続いて、具体的な制御を図５を参照して説明する。図５は、本発明に係る車両制動制御装置による制動制御時の減速度とブレーキ油圧の時間変化を表すグラフである。

【００２５】図５にしめされる時刻０の時点で運転者がブレーキペダル１０を踏み込んで、減速操作を開始したとする。ブレーキペダル１０の踏み込みに応じて、前輪ＦＲ、ＦＬそれぞれのホイルシリンダ２５、２６へ供給する液圧Ｐｆと後輪ＲＲ、ＲＬそれぞれのホイルシリン

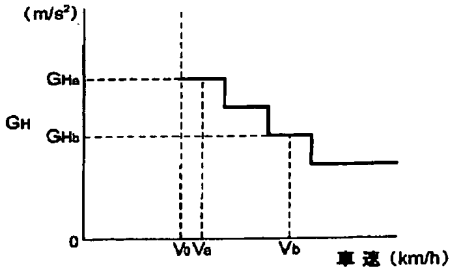
【図２】


40
10
11
50
16
17
18
15
37
13
12
38
車輪速センサ
41～44
36
35
23
22
100
制動制御センサ
リザーバー
リザーバー
20
FL
27
RR
RL
28
FR
25

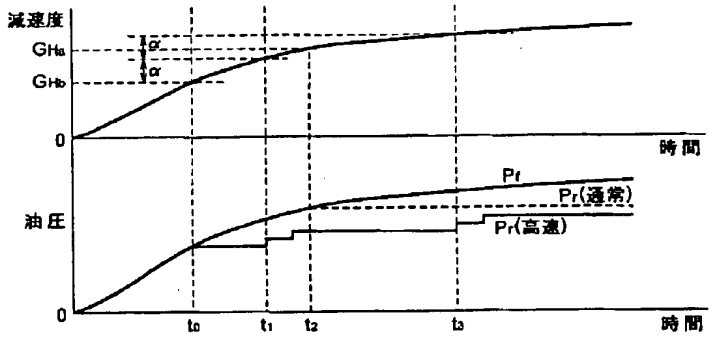
【図３】


スタート
V(車速)読み込み、G(減速度)演算
S1
制御中？
S2
Y
N
G>GH?
S3
Y
N
・後輪制動液圧保持出力
・Gx_M←G
S4
G>Gx_M+α？
S5
N
Y
・後輪制動液圧パルス増出力
・Gx M←G
S6
G>GH？
S7
Y
N
・後輪制動液圧保持解除
S8
リターン

【図４】


(m/s²)
GHa
GH
GHb
0
Vo
Va
Vb
車 速 (km/h)

【図5】



フロントページの続き

Fターム(参考)　3D045 BB37 CC01 EE21 FF42 GG00
GG10
3D046 BB31 CC02 EE01 FF04 HH02
HH26 JJ04 KK07